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The Amazon Rainforest: How Can The United States Assist the Government of Brazil in its Efforts to Protect the Amazon Basin From Further Deforestation?

by

Mr. William E. Damon, Jr.
U.S. Department of Agriculture
Forest Service

Faculty Research Advisor
Dr. John E. Starron, Jr.

The Industrial College of the Armed Forces
Fort McNair, DC 20319-6000

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The Amazon Rainforest: How Can the United States Assist the Government of Brazil in its Efforts to Protect the Amazon Basin from Further Deforestation?

A Research Paper

by

William Earl Damon, Jr.

ICAF Class of 1990

Abstract: The government of Brazil has become increasingly sensitive to international criticism over the rapid deforestation of the Amazon rainforest. In 1989 the government of Brazil asked the World Bank for funding for a project which would, among other things, finance the establishment of a network of national forests in Brazil. The United States Forest Service was asked to serve as consultants to the World Bank to review this project and to analyze the capabilities of the government of Brazil to manage and administer a large network of national forests. The U.S. Forest Service found that the current governmental leadership in forestry in Brazil is not capable of managing a large network of national forests, but with the commitment of the government of Brazil, and with appropriate technical advice and assistance from the United States, the government of Brazil could reverse the situation and create the management infrastructure required to establish, protect, and manage a large network of national forests.

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Introduction

In the past, environmental issues have been primarily matters of local interest, or, in the most extreme cases, matters of national concern. World leaders, concerned with such weighty matters as international conflicts and major economic problems, have not traditionally placed environmental issues high on their list of priority items needing resolution on an international scale. However, a rising environmental sensitivity is resulting in the elevation of environmental concerns to the point where national leaders are placing environmental issues high on their agendas.

For the first time, national leaders are voicing concern about the environment in a variety of national and international forums. President Bush, in his campaign for the Presidency of the United States in 1988, stressed his commitment to protection of the environment throughout his campaign appearances. Leaders of other nations have also shown an increasing sensitivity to environmental issues. President Sarney of Brazil, early in 1989, announced a major environmental program entitled 'Our Nature'. This program was intended, among other things, to convince the international community that Brazil was serious about protecting the environmental resources within her borders. Another example is found in Canada's concern over acid rain, and the resulting consequences of atmospheric deposition of American pollutants on Canadian territory. These issues demonstrate how environmental issues are moving to the forefront of political discussions between world leaders.

The United States is one of the world's leaders in contributing to the level of pollutants in Earth's atmosphere, and the United States therefore bears a special responsibility in the search for ways to alleviate the problems that mankind is creating in our environment. The United States

Government is committed to becoming a world leader in environmental security, and as a result of that commitment the U.S. Government is actively seeking opportunities to play a leading role in addressing environmental issues of international concern.[1]

One of the most significant opportunities that the U.S. Government can pursue in this area is the exploration of ways to assist the Government of Brazil in the protection of the Amazon rainforest. Brazil has come under increasing international criticism throughout the 1980's over the method and extent of deforestation that has been occurring in the Amazon basin. The issue has reached the point where it has not only been discussed and debated heavily in scientific journals, but it has also become the cover article for such popular press journals as Time[2] and National Geographic[3].

In October of 1989, the World Bank asked the United States Department of Agriculture -- Forest Service to participate in a World Bank mission to Brazil as consultants on a Brazilian request for World Bank funding for a project which would, among other things, create a network of National Forests in the Amazon Region of Brazil. This mission, which included three weeks of on-site review of the situation in Brazil by U.S. Forest Service consultants, identified a number of ways in which the U.S. Government might be able to assist Brazil in the protection of the Amazon rainforest.

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[1] Meeting between Secretary of State James Baker, Secretary of Agriculture Clayton Yeutter, and Forest Service Chief Dale Robertson, September 25, 1989, in Washington, DC.

[2] Time, "Torching the Amazon -- Can the Rain Forest be Saved?", September 18, 1989.

[3] National Geographic, "As we begin our second century, the Geographic asks 'Can Man Save This Fragile Earth?'", Vol. 174, No. 6, December 1988.

This paper focuses on the findings of that mission and the opportunities for international environmental cooperation that resulted from that mission.

Background

Deforestation of the Amazon Rainforest

Concern over the extent of deforestation -- and the pace of that deforestation -- in the Amazon rainforest has been the subject of numerous scientific articles throughout the 1980's. Some of the most severe deforestation has taken place in the Brazilian state of Rondonia, located in the western portion of the Amazon basin. Landsat images taken in 1973 and again in 1987 indicate that as much as 20 percent of the rainforest in Rondonia may have been destroyed.[4]

Extrapolation of this rate of deforestation to the entire Amazon rainforest cannot be assumed, however, until one studies the situation in Rondonia in more depth. The most important factor leading to the rapid deforestation of Rondonia was the building of a road through the Amazon rainforest linking the capital of Rondonia, Porto Velho, with the capital of Mato Grosso, Curiaba. This road, known as BR-364, opened up vast areas of the rainforest in Rondonia to settlers who heretofore had no access to the area.

Lack of Government Protection

Another factor which led to the rapid deforestation of so much of Rondonia was the absence of any type of government protection for the rainforest. In fact, the intent was specifically not to protect the rainforest but rather to convert as much of it to agricultural uses as possible. Brazil's Second National Development Plan stated that "The

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[4] "Brazil's Imperiled Rain Forest", National Geographic, op. cit.

occupation of new areas should continue...in view of the fact that the gigantic highway system, already constructed, has placed at the disposition of the [agricultural] sector immense areas...in Amazonia."[5] Note that the stated intent of the government to place these rainforest areas at the disposition of the agricultural sector was made even though no sustainable agricultural use of converted rainforest has yet been identified in the Amazon basin.

Historical Analogies in Westward Expansion in the U.S. and Brazil

In many ways the situation in Brazil today is analogous to the situation in the United States in the late 1800's. Brazil has a vast, largely unpopulated west which is known to contain enormous economic potential in the form of minerals and timber. Brazil faces a rapidly growing population (a birth rate of 32 per 1000 population places Brazil in seventh place among nations with a population greater than 50,000,000 people) and that growing population requires food, opportunities, jobs, and land. Like the United States of the late 1800's, Brazil today looks to the west -- to the Amazon basin -- as the answer to many of the pressures that Brazil faces from her rapidly growing population.

Unfortunately for Brazil, however, the parallels between the United States and Brazil are not identical in one very important area. Unlike the situation in much of the United States, where fertile soils were found under forests, the soils that are typically found in the tropical rainforests of Brazil are very low in nutrients and cannot sustain any type of agriculture over a long period of time. Discussions with officials of the Brazilian

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[5] Fearnside, Philip M. (1985): "Environmental Change and Deforestation in the Brazilian Amazon, pp. 79-89. In J. Hemming (ed.) *Change in the Amazon Basin: Man's Impact on Forest and Rivers*, (Manchester, U.K., Manchester University Press).

Institute for Agriculture and Ranching Research (EMBRAPA) indicate that no sustainable agricultural endeavor has yet been identified that they are confident can be used on lands converted from tropical rainforests to other agricultural uses.[6] The two most frequently tried conversions, farming and cattle ranching, have not proven to be sustainable. Officials of the Brazilian Institute for the Environment and Renewable Natural Resources advised U.S. Forest Service officials that rainforest converted to cattle ranching shows drastic declines in productivity for use as pasturage: in the first year following clearing of the rainforest, the lands in Rondonia could typically support 2.5 cows per hectare; in the second year, 1.5 cows per hectare; and by the third year, only .5 cows per hectare could be supported on those lands.[7]

Government Incentives Encouraging Deforestation

A major factor in the rapid deforestation in the state of Rondonia is government policies which encourage -- in fact, which almost mandate -- clearing of tropical rainforest lands. The government of Brazil, for several years, provided government incentives in the form of tax breaks and other financial incentives to landowners who invest in Amazonian ranches. In fact, government approved ranching projects were required to adhere to a schedule for clearing to qualify for continued incentives.[8]

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[6] Interview with EMBRAPA scientist Jorge Alberto Gazel Yared, October 9, 1989, by the author and other Forest Service consultants.

[7] Interviews with Brazilian Institute for Renewable Natural Resources Officials in Porto Velho, Rondonia, Brazil, October 1989.

[8] Fearnside, Philip M. "Causes of Deforestation in the Brazilian Amazon", *The Geophysiology of Amazonia*, Dickinson, Robert E., (ed.), John Wiley & Sons, 1987.

Brazilian government actions in the Amazon basin have traditionally been oriented towards the elimination of the tropical rainforests. The rainforests, much like the forests in the western United States in the 1800's, were viewed as obstacles to progress and as sources of potential wealth -- extractive wealth, such as minerals and logging. It is no surprise, then, that the government policies have thus far focused on the elimination of what is seen as a serious obstacle to Brazil's economic progress.

International Environmental Pressures

However, the Brazilian government found itself under increasing scrutiny by the international environmental community in the late 1980's. The Brazilian government reaction was typically nationalistic: the government regarded outside criticism as unwarranted interference in Brazil's internal affairs, and the Brazilian government's initial response to such criticisms was to dismiss the criticisms on that basis. Attempts by the government of Brazil to ignore the outcry from the international environmental community did not quiet the critics of Brazil's policies, however, and by early 1989 President Sarney of Brazil reached the conclusion that Brazil must take some action that would convince the rest of the world that Brazil took its environmental responsibilities seriously and was willing to take actions to put its house in order.

Accordingly, in March of 1989, President Sarney launched the 'Our Nature' program. In that program, a number of government agencies dealing with environmental issues were brought together under a single umbrella agency known as the Brazilian Institute for the Environment and Renewable Natural Resources. In addition to the announcements of governmental reorganization, President Sarney also announced a temporary suspension of the government

incentives which have contributed to so much of the destruction of the Amazon rainforest. These incentives were suspended on a temporary basis and were to be reviewed once the new government takes power in 1990. (Brazil elected a new President in December of 1989.) The important point to note in this decision by President Sarney is that the decision itself shows that, government protestations to the contrary, international pressure to save the Amazon is having some effect.

The question that the United States faces, then, is to realistically assess what the United States can do to assist Brazil in protecting and preserving as much of the Amazon rainforest as possible. The situation is extremely delicate because of nationalistic sentiments among the people of Brazil. They resent, as would any sovereign nation, attempts by outsiders telling them how to manage their internal affairs.

Current Situation

World Bank Mission

In September of 1989 the World Bank asked the U.S. Forest Service to provide consultants for a mission to Brazil. The mission was a preparation mission to help the staff of the Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA) to prepare components of a National Forestry Development and Conversation Project for consideration -- and possible financing -- by the World Bank.

U.S. Leadership Role in Environmental Security

This mission dovetailed very well with the expressed wishes of the Bush administration for the United States to assume a leadership role in environmental security. As an integral part of the World Bank mission, U.S.

Forest Service officials would have an opportunity to visit with their counterparts in Brazil and to evaluate the current situation in Brazil regarding protection and management of forest lands.

Establishment of a Network of National Forests in Brazil

In fact, the charter for the U.S. Forest Service consultants specifically asked the U.S. Forest Service to assist IBAMA in designing a component for the efficient and effective establishment of a network of national forests and the initiation of effective administrative and management programs for existing -- and future -- national forests. The U.S. Forest Service was also asked to evaluate the success or failure of the various sustained management programs in the tropical rainforest and to make recommendations for their future. Lastly, the U.S. Forest Service was asked to evaluate the capabilities of the IBAMA staff to carry out the forest management objectives inherent in the administration and management of a network of national forests.

The U.S. Forest Service agreed to assist the World Bank, and in October, 1989, the U.S. Forest Service sent three consultants to Brazil to carry out this mission. The Forest Service was represented by Jeff M. Sirmon, Deputy Chief, Programs and Legislation, U.S. Department of Agriculture, Forest Service; William E. Damon, Information Manager for Programs and Legislation (and the author of this paper); and Peter Weaver, a tropical forestry specialist with extensive experience in tropical forest silviculture. The World Bank was represented by William D. Beattie, Forestry Specialist, Technical Department, Agriculture Division for Latin America and the Caribbean.

Evaluation of the Forestry Situation in Brazil

Evaluation of the forestry situation in Brazil was, as stated earlier, the overriding purpose of the mission to Brazil, and the mission was conducted by a combination of visits to various management offices of the Brazilian Institute for the Environment and Renewable Natural Resources and several field visits to existing national forests in Brazil. Prior to the beginning of the trip to Brazil, the mission participants developed some key questions that they felt needed to be answered in the search for ways that the United States could assist Brazil in the management of a network of national forests. These questions were:

- What is the current status of national forest management in Brazil? How extensive is the existing network of national forests? What plans exist to increase the amount of land designated as national forests?
- How effective is the forest management infrastructure in Brazil? How many people are dedicated to the management and protection of national forests in Brazil?
- How effective is the forest research program in Brazil? Are they adequately staffed and financed to carry out significant research in tropical forestry management and silviculture?
- What barriers -- social, political, economic -- exist that could hinder the provision of technical advice and assistance to the government of Brazil in the area of national forest administration and management?
- What opportunities exist -- or could be created -- for the United States to become actively engaged in an advisory and assistance

role in the protection and preservation of the tropical rainforests of Brazil?

National Forest Management Infrastructure

In order to answer these questions, the mission first looked at the forest management structure at the national government level in Brazil. Information about how the Brazilian government has organized its national forest management activities was obtained in a series of interviews in Brasilia, the capital of Brazil. Interviews were conducted primarily at the headquarters of the Brazilian Institute for the Environment and Renewable Natural Resources.[9]

Organization

In February of 1989, as part of the 'Our Nature' program, the government of Brazil combined a number of agencies dealing with natural resource issues

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[9] The following individuals at the Institute for the Environment and Renewable National Resources were interviewed during visits to Brasilia, Brazil, in October, 1989:

Antonio Carlos do Prado, Director, Department of Renewable Natural Resources

Jose Carolos Carvalho, Director of Supervision and Control

Raimundo Deusdara, Division of Forestry and Wildlife

Dr. Ana Luisa Fagundes Salamao, Division Leader, Division of Forest Management

Carlos Ribeiro, Division Leader, Division of Silviculture

Joao C. Nedel, National Forests

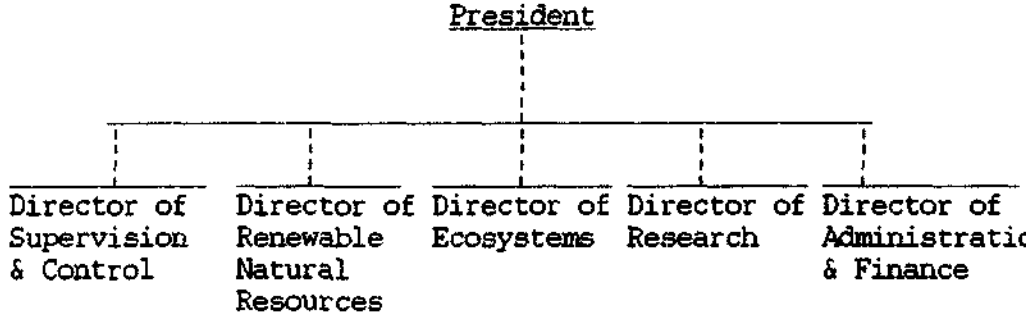
Tarcisio Pereira, Division of Forest Management

Marco Antonio Fujihara, National Association of Pulp and Paper Manufacturers

under a single institute known as the Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA). This consolidation of agencies brought together the following governmental functions:

- o Environmental Protection
- o Research on Management and Use of Natural Resources
- o Forest Management (Renewable Natural Resources)
- o Ecosystem Management
- o Supervision and Control of such matters as Environmental Quality, Licensing and Registration of activities dealing with natural resources; and monitoring and supervision of activities in the natural resource field.
- o Administration, Finance, and Personnel for the IBAMA organization

The main components of IBAMA are structured as follows:



Of particular interest from a forest management perspective is the fact that the old Brazilian Forest Service, the Brazilian Institute for Forestry Development (IBDF), was reassigned to the IBAMA organization under the Director of Renewable Natural Resources. The various departments of the old IBDF, such as Research, Forest Economics, Reforestation, National Parks, and Marketing and Industrialization, are now scattered among a variety of different directorates within the IBAMA organization (and possibly even outside the IBAMA organization.) This dismantling of a comprehensive forest

management and research organization has had a noticeable impact on morale and staffing within IBAMA, particularly where forestry professionals are concerned.

Thus, forest management in Brazil has been downgraded from an activity important enough to have its own institute to a department buried under a directorate within IBAMA. This loss of status contributes to a perception that the government is not fully committed to forest management over the long term.

Problems with Forest Management and Administration

During the interviews with IBAMA officials, the mission participants were briefed on a variety of problems which the IBAMA officials in Brasilia feel are having a negative impact on their ability to carry out their assigned national forest management mission. These problems include:

- National forests are being created for security reasons in some cases. Philip M. Fearnside, in an article on the conflicting objectives of Brazil's Amazon settlement schemes, observed that "The fear that Amazonia is never far from invasion by foreigners is a recurrent one in Brazil."[10]
- IBAMA is not being consulted regarding the creation of national forests.
- Some of the national forests are located next to Indian reserves.
- Brazil has broad legal direction for their national forests but no implementing regulations for those laws.

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[10] Fearnside, Philip M., "Brazil's Amazon Settlement Schemes -- Conflicting Objectives and Human Carrying Capacity", *Habitat International*, Vol 8, No. 1, pp. 45-61, 1984.

- o There is very little law enforcement on the national forests -- an example was discussed from the October 3 newspaper in which three forest police were in hiding on an island in the Tapajos river after being threatened by gun-wielding turtle egg poachers.
- o Trespass and occupancy are major problems.
- o Military assets are used in law enforcement and fire control.
- o Almost none of the national forest boundaries are marked.

Personnel

One of the driving forces behind the creation of IBAMA was to improve efficiency and to get people working together. However, the number of positions and salaries are very severely limited by economic constraints, such as the fact that IBAMA cannot increase salaries for individual positions nor can they increase salaries in total.

IBAMA now consists of approximately 6,200 employees, with 1,200 in Brasilia, and 5,000 in state and field offices. In answer to U.S. questions about how many people are really in field jobs, the answer seems to be about 330 employees -- most of them being former employees of the Brazilian Institute for Forestry Development (IBDF). This is in contrast to the United States Forest Service, which has 29,000 full time employees (of which some 15,000 are in field offices) and which hires an additional 15-20,000 temporary seasonal field workers each year.

IBAMA has a special degree of autonomy -- they are a little more independent than a regular bureaucracy, and therefore they have a little more flexibility in hiring and salary structures. (NOTE: However, throughout the visit, the hiring procedures and salary structures were consistently mentioned as major problems, especially by field personnel at locations we visited.)

IBAMA tried to address the salary problem for field personnel by a proposal to pay people who work in the interior up to 80% more than they would make elsewhere, but the proposal was not accepted by the government. The end result of these types of problems is that IBAMA is losing a lot of people -- they are going into the private sector where salaries are much higher. Note, though, that this problem is not specific to IBAMA -- it is true of all government agencies, and it is caused in large measure by the galloping inflation (over 30% per month) that Brazil is currently suffering. The people who stay with the government (and IBAMA) under such circumstances tend to be low quality employees who can't or won't get higher paying jobs in the private sector.

Benefits of IBAMA

One benefit of IBAMA is that existing laws and regulations to protect the environment and forests get more attention and more enforcement activity -- supposedly the laws and regulations have more force now. (NOTE: This conflicts with what we were told in subsequent field visits.)

Law Enforcement on Forest Lands

In Brazil, there are a number of different police organizations who play a role in law enforcement on national forests. They have a military police, who are not really military at all but rather are the equivalent of U.S. state police forces. In addition, some states in Brazil have a group of forest policemen as part of their regular civilian police force, which is confusingly known, again, as the military police. Note that these forest policemen are supposed to enforce forestry laws on property outside national forests. National forests are supposed to provide their own security forces. All of

the states who have forest police have agreements with IBAMA on the role of those forces.

National Parks in Brazil

The Brazilian park service was also described to us. The park service is quite small -- about 130 people in Brasilia and about 200 in the field. The rules in Brazil's national parks are much like those in the U.S. -- no hunting or fishing. In addition, and in contrast to U.S. policies in Alaska, the Brazilians have made no formal arrangements for legal subsistence hunting and/or fishing by Indians whose traditional homelands are in national parks. However, Indians have rights in their traditional areas which supersede park rules, a matter of some concern to IBAMA since in the future, as the Indians get more sophisticated, they could try to come in and harvest commodities such as timber off national park lands which are also traditional Indian areas.

National Forest Policies

General Objectives

Brazil states that they adhere to a policy of multiple use on their national forests -- sustained production of timber, protection of water quality and flows; sustainment and protection of wildlife; and recreation.

The national forests have primary and secondary objectives: the primary objective is sustained timber production, and the secondary objectives are to develop sustained yield models for others to emulate. They also have other secondary objectives, such as to help regulate timber markets. In the south of Brazil, private land is all cut over -- so much so that even industry is beginning to recognize that there are no reserves left in the south. Accordingly, industry is beginning to agree that the Federal government has a

role to play in the establishment of forest reserves for the long-term benefit of the country.

Additional secondary objectives include:

- o preservation of flora & fauna -- they will identify areas which deserve preservation and act accordingly.
- o environmental education and recreation (now a secondary objective, this may eventually become a primary objective)

One example cited to show how the timber industry and local officials are beginning to recognize the importance of national forests occurred in the Tapajos National Forest in the Amazon basin. A management plan for the Tapajos was ready years ago, but no would go in and harvest the timber there because there was no market (there was a lot of wood available from other sources, some legal, some not). However, lots of settlements have started in that area and the timber readily available on lands outside the Tapajos has been cut. Local sawmills are now complaining of a lack of raw material. So the Tapajos is now in a good position to begin sustained timber production from national forest lands.

Criteria for Establishing New National Forests

When Mr. Sirmon briefed the officials in IBAMA's Brasilia headquarters about the history of the U.S. Forest Service and the manner in which national forests were established in the United States, the Brazilians expressed particular interest in the criteria used by the United States to determine how much -- and what kind -- of public lands would be designated as national forests. Brazil is currently trying to decide those very issues. Officials in IBAMA told Mr. Sirmon that Brazil currently is using the following criteria for the establishment of new national forests in Brazil:

1. Brazil would prefer to have national forests close to industries that need timber, but that is virtually impossible since existing industries have already cut all the timber close to them.
2. Another criteria mentioned for the establishment of national forests is the potential of the land for reforestation. Some non-forested lands may be included in national forests for this reason.
3. Brazil prefers where possible to have natural boundaries around national forest land, such as rivers.
4. As mentioned earlier, national security considerations are also involved in the decision to establish national forests.

The climate for the creation of new national forests in Brazil is very favorable at the current time. All that is needed to establish a new national forest is a presidential decree -- and it takes an act of Congress to eliminate a national forest once it is established.

When new national forests are created, a feasibility study is conducted, and some of the things looked at are climate, vegetation, soils, topography, access, land ownership/tenure, and other government interests.

When creating new national forests, the following general principles apply: In undeveloped areas, squatters on national forests are usually reimbursed for the costs of any structures they have built but not for the land itself. In developed areas, Brazil simply buys the land. If other government agencies have control of land, a Presidential decree is obtained to reclassify land as a national forest.

Current Status of Lands Designated as National Forests

Brazil currently has approximately 8 million hectares of land officially designated as national forests. These existing national forests range from very small (3,500 Ha) to fairly large (2.6 million Ha). In contrast, the United States has 78 million hectares of national forests -- approximately 8 percent of the total area of the United States.

IBAMA is currently looking at a target of 5 percent of the surface area of Brazil as a general rule of thumb for how much land should go into national forests (5 percent = 45 million ha, 23 million ha of which would be in the Amazon.)

Planning

There is no comprehensive national forest planning system as we know it in the United States. In addition, the concept of forest planning in Brazil is much different -- and much more limited -- than in the United States. While some management plans for some national forests in Brazil have been completed, these plans are not generally multiple-use plans as we know them in the United States. The plans that IBAMA officials refer to as Forest Management Plans are pretty much timber harvest plans, not integrated forest management plans.

Forest plans of the type described in the preceding paragraph have been completed, or are nearing completion, for 5 national forests ranging in size from 500 to 1600 ha.

Regulations

Brazil has passed a variety of laws concerning protection and use of natural resources, including timber and other commodities on national forest lands. However, the regulations essential to implementation of those laws

have not been written and put into effect. Without implementing regulations, the enforcement of existing laws is very spotty in many instances and virtually non-existent in others.

Pulp and Paper Industry

The pulp and paper industry is extremely important to Brazil, both because of the number of jobs supported by that industry -- some 50,000 jobs -- and because of the value of foreign exchange earned: 1.3 billion U.S. dollars in 1988.

The pulp and paper industry in Brazil is currently the 8th largest in the world, and the pulp and paper industry plans to invest US $ 10 billion by the year 2000 to strengthen that position and move into 4th place. In addition, the investment are intended to help the pulp and paper industry achieve complete self-sufficiency in wood supplies (they currently are 80% self-sufficient). Brazilian law requires that users of renewable natural resources must be self-sufficient in those resources. This law applies both to the pulp and paper industry and to other industries -- such as the pig iron industry, a major consumer of charcoal -- as well. Examples were cited of one Brazilian company that was required to pay a fine of 13,000,000 cruzados for violating laws which require them to establish plantations to provide their wood supplies.

In the south of Brazil there is too much competition for land for the industry to be able to completely support itself at the 100% goal. There is just not enough land available for planting. Therefore, the pulp and paper industry is moving north where competition for land is less intense.

Mining

The situation regarding mining on national forests is quite confused. There are no regulations prescribing standards regarding such actions as soil erosion, control of pollutant levels in streams and rivers, disposal of mining wastes, or land reclamation following mining activities. For example, on one national forest in the Amazon basin there are 50,000 prospectors working gold mines without permits or authorization of any kind. No one in IBAMA is quite sure how to deal with that problem. The prospectors clearly cannot just be driven off the national forest. There are too many of them and the resulting social problems (what would Brazil do with those 50,000 people if they forced them off the gold mines?) are virtually insoluble. The problem is compounded by reports that many of the gold miners are using mercury to extract the gold from the ore, and that mercury is ending up in the rivers of the Amazon basin, poisoning the fish which are a major source of food for the indigenous population.

IBAMA said a working group has been created to come up with regulations for mining in national forests.

Research

The status of forest research activities in Brazil was also reviewed, with special attention to the research done in sustained forest management models in tropical rainforests. Brazil's forest research projects are currently being handled by the Brazilian Institute for Agriculture and Ranching Research (EMBRAPA). The mission visited EMBRAPA offices in Belem and Curitiba, Brazil.[11]

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[11] Interviews with Jose Elidney Pinto, Jr., Vice Director, EMBRAPA, Curitiba, Parana, Brazil, October 17, 1989.

In the past, under the old Institute for Forestry Development (IBDF), forest research was conducted under the auspices of that agency. However, in 1977, an inter-agency agreement was signed transferring responsibility for forest research from the IBDF organization to the EMBRAPA organization. The IBDF organization lacked the resources to carry out sound, professional research, and the EMBRAPA organization was much better equipped and funded to take on that task.

In addition, a special National Institute for Research in the Amazon (INPA) was established in Manaus, at the junction of the Rio Negro and Amazon Rivers in the heart of the Amazon basin. This institute has a large laboratory dedicated to research in wood technology, with special emphasis being placed on the properties of wood species in the Amazon.

In interviews with Mr. Pinto the relationship between INPA and EMBRAPA was described as follows: INPA concentrates on seed and wood technology; EMBRAPA concentrates on harvesting techniques and silviculture (including the study of sustained forest management models in tropical rainforests.) In addition, there is an informal geographical split between the two agencies, with INPA concentrating in one part of the Amazon basin while EMBRAPA works in another part.

In addition, Mr. Pinto stated that INPA has been crippled by budget cuts -- a fact that was confirmed in an interview with Mr. Otto Schubart, the Director General of INPA -- whereas EMBRAPA is currently in an expansionist mode.[12] This expansionist mode continues even under current government

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[12] Interview with Otto Schubart, Director General, National Institute for Research in the Amazon, Manaus, Brazil, October 9, 1989.

policies restricting hiring. The President of Brazil specifically exempted EMBRAPA from the government hiring freeze.

INPA, on the other hand, is in desperate financial condition. INPA funds have been cut to the point where INPA cannot even maintain the equipment in the wood technology laboratory in Manaus. During visits by the World Bank mission, the impacts of the funding cuts were visible throughout the facility. Vehicles which had broken down were parked and cannibalized in an effort to keep the rest of the vehicles operating; computers used to support the wood technology research efforts were out of order and funds were not available to repair or replace them; and Mr. Schubart informed us that INPA had researchers available to conduct research but no funds with which to conduct the research.

Conclusions

In order to summarize the findings and conclusions of the World Bank Mission, we will refer back to the questions formulated in the section of this paper entitled 'Evaluation of the Forestry Situation in Brazil.'

1. What is the current status of national forest management in Brazil? How extensive is the existing network of national forests? What plans exist to increase the amount of land designated as national forests?

National forest management in Brazil is clearly in a very early stage of development. While there are currently 8 million hectares of designated national forests, management plans for most of those national forests do not exist. Officials in IBAMA indicate an eventual aim of placing some 45 million hectares in national forests.

2. How effective is the forest management infrastructure in Brazil? How many people are dedicated to the management and protection of national forests in Brazil?

The existing forest management infrastructure in Brazil is not capable of providing the leadership necessary to initiate and manage a large network of national forests. The number of people dedicated to forest management and protection -- some 330 field employees nationwide -- is far too low to adequately manage even the existing 8 million hectares of national forests, and clearly cannot begin to cope with a network of national forests almost six times that large. Substantial increases in staffing are essential if Brazil is to establish, protect, and manage a large network of national forests.

3. How effective is the forest research program in Brazil? Are they adequately staffed and financed to carry out significant research in tropical forestry management and silviculture?

The forest research program in Brazil -- currently concentrated in the EMBRAPA and INCA organizations -- is capable of conducting high quality scientific research. The research staffs of both organizations are well-trained and capable scientists with advanced degrees from a wide range of universities including many internationally respected universities such as Michigan State in the United States and Oxford in the United Kingdom. The biggest problem facing the research organizations is the lack of adequate funding. Substantial infusions of funding are needed to revitalize what was once an impressive and effective research organization.

4. What barriers -- social, political, economic -- exist that could hinder the provision of technical advice and assistance to the

government of Brazil in the area of national forest administration and management?

The barriers that will prove to be most troublesome deal with the attitudes of the people -- and the government -- towards forests and forestry in general. The tendency to regard tropical rainforests as barriers to economic progress rather than as valuable resources in and of themselves must be changed. The lack of any real feeling for the land as a resource worthy of protection and wise management was evident in many of the locations visited during this mission. Especially troubling was the absence of this feeling not only on the part of the general populace but on the part of some of the officials charged with the protection and management of the land.

In addition, economic problems -- largely the result of extremely high inflation rates -- will plague efforts to assist the government of Brazil in the area of national forest administration and management. Government efforts to reduce government spending will conflict with the need to substantially increase the staffs needed to administer and manage a large network of national forests. Unless the new government of Brazil recognizes the importance of establishing, protecting, and managing a large network of national forests, there is little that the United States can do to alleviate the situation.

5. What opportunities exist -- or could be created -- for the United States to become actively engaged in an advisory and assistance role in the protection and preservation of the tropical rainforests in Brazil?

The United States could assist Brazil in a number of technical areas, including provision of technical expertise for such tasks as:[13]

1. Creation of national forests.
2. Posting and marking of boundaries of national forests.
3. Development and implementation of regulations for use and occupancy.
4. Development of management plans.
5. Development of model plans for custodial management for forests likely to be isolated for several years.
6. Development of educational programs on location, purposes, use and future of national forests in Brazil.
7. Development and presentation of training and other exercises on how to manage a system of national forests.
8. Definition of research needs for multiple-use/sustained yield management models in tropical rainforests.
9. Strengthening IBAMA's institutional systems and processes.
10. Reactivation of in-house strategic land management planning.
11. Increasing the visibility and authority of the forest service within the IBAMA organization.
12. Focus IBAMA organizational resources on development and management of a new, expanded national forest system.
13. Review and restructuring conflicting laws and regulations with an emphasis on shifting some existing policy type functions to states.

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[1] "Brazil -- National Forestry Development and Conservation Project Preparation Mission: A Report"; Jeff M. Sirmon, Peter L. Weaver, and William E. Damon; USDA - Forest Service, November, 1989.

14. Expansion of extension work with states and landowners.

15. Establishment of combined USDA-Forest Service/IBAMA training teams.

16. Assignment of full-time USDA-Forest Service and IBAMA experts to coordinate cooperative ventures between Brazil and the U.S. in forest management.

17. Establishment of a bi-lateral agreement between the United States and Brazil.

18. Continued participation in the U.S.-Brazil Scientific and Technical Exchange Program.

19. Work in concert with the Tropical Forestry Action Plan prepared by the Food and Agriculture Organization.

20. Establishment of a focal point in Washington, DC, for Brazilian/USDA-Forest Service matters.

The United States government has expressed a willingness to provide technical advice and assistance to the government of Brazil to tackle the immense job of protection and wise use and management of the tropical rainforests in Brazil. But, in the final analysis, the United States cannot solve this problem for Brazil -- only Brazil, acting in a spirit on enlightened self-interest, can provide the will and the resources to protect and manage wisely this immensely valuable ecological treasure. The new government of Brazil will face some very difficult and challenging issues in the next few years. Let us hope that the new government will recognize the immense importance of these rainforests -- not only to Brazil but to all the world -- and take the necessary actions to protect and manage the rainforests wisely.